WARRANTY

LIMITED WARRANTY

The ORP-200, manufactured by HM Digital, Inc. ("the Company") is warranted to the purchaser against defective materials and workmanship for one (1) year from the date of purchase. The ORP-200 sensor is warranted to the purchaser against defective materials for six (6) months from date of purchase.

What is covered: Repair parts and labor, or replacement at the Company's option. Transportation charges for repaired or new product to be returned to the purchaser.

What is not covered: Transportation charges for the defective product to be sent to the Company. Any consequential damages, incidental damages, or incidental expenses, including damages to property. This includes damages from abuse or improper maintenance such as tampering, wear and tear, water damage, or any other physical damage. The ORP-200 is watertight and completely submersible. Please ensure that the battery compartment and probe gasket ring are firmly tightened before submersing in water. The warranty does not cover water damage to the ORP-200 due to parts not securely closed. Products with any evidence of such damage will not be repaired or replaced.

How to obtain warranty performance: Attach to the product your name, address, description of problem, phone number, and proof of date of purchase, package and return to:

HM Digital, Inc.
ATTN: Returns
5819 Uplander Way
Culver City, CA 90230
U.S.A.

Implied Warranties: Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to five years from date of purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. To the extent any provision of this warranty is prohibited by federal and state law and cannot be preempted, it shall not be applicable. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

NOTE: Warranties are product-specific. Third-party products and products deemed by HM Digital as "accessories" are not covered under warranty. Third-party products include, but are not limited to, batteries and fittings. Accessories include, but are not limited to calibration buffers, storage solution, lanyards and product cases.

This manual and all information contained herein is copyright HM Digital, Inc.

USER'S GUIDE

ORP-200

ORP / TEMP METER

HM Digital, Inc.

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OVERVIEW

Thank you for purchasing HM Digital's ORP-200 Meter. The ORP-200 is an advanced, micro-processor-based handheld, watertight ORP meter with superior accuracy. It can be used for testing the Oxidation Reduction (Redox) Potential levels of almost any liquid, provided the liquid contains less than 50% alcohol and a conductivity of at least 10 μS (5 ppm). It also measures temperature in both Celsius and Fahrenheit. Though the meter is factory calibrated, ORP meters require frequent recalibration. The ORP-200 features digital calibration for easy and precise calibration.

WHAT IS ORP? ORP, or Redox, describes all chemical reactions in which atoms have their oxidation number (oxidation state) changed and is thus a measurement of water's ability to oxidize contaminants. The higher the ORP, the greater the number of oxidizing agents.

Checking ORP is a simple method to monitor the effectiveness of a sanitizer or the quantity of anti-oxidants in a liquid. In generalized terms for humans, a higher ORP is better for outside of the body, while a lower ORP is preferred for consumption due to the high anti-oxidant value. There are numerous applications for ORP, each with its own specific optimum value. For example, the minimum ORP for pool & spa disinfection (set by the World Health Organization) is 650 mV. [The use of ORP testing in pools and spas should not eliminate nor supersede the use of sanitizer testing with standard kits.] Though the WHO has not set a standard for ORP in drinking water, anything below -550mV is considered too strong and is not recommended for drinking.

*****HM Digital makes no health claims regarding ORP nor the use of ORP testing. It is the responsibility of the user to consult a professional in the applicable field for all safety and health concerns prior to the use of this meter.***

CONTACT INFORMATION

If you have any problems or questions regarding your meter, please contact HM Digital, Inc.

HM Digital, Inc.
5819 Uplander Way
Culver City, CA 90230, U.S.A.

info@hmdigital.com
www.hmdigital.com
1-800-383-2777

SPECIFICATIONS

ORP Range: -999 to +1000mV
Temperature Range: 1-80 ℃; 33-176 ℉
Resolution: **ORP:** 1 mV; **Temperature:** 0.1 ℃/F
Accuracy: 0.5% (+/- 2 mV)
Calibration: Auto-ranging with digital fine tuning (factory calibrated to +200mV)
Auto Shut-Off: After 5 minutes
Probe: Glass sensor and platinum reference cell encased in glass
Safe Operating Temperature: 1-80 ℃; 33-176 ℉ (measuring in extreme temperatures is not recommended)
Minimum Conductivity: For accurate and stable readings, the liquid to be tested must have a conductivity of at least 10 μS (5 ppm). The meter will not work in pure or distilled water.
Display: LCD panel
Housing: Waterproof (submersible); floats
Power source: 3 x 1.5V button cell batteries (included), model 357A
Dimensions: 18.5 x 3.4 x 3.4 cm (7.3 x 1.3 x 1.3 inches)
Weight: 95 grams (3.35 ounces)

Changing the batteries:

When the meter displays a flashing battery symbol, your batteries are getting weak and should be replaced soon. To change the batteries:

1. Twist open the battery compartment on the top of the meter.
2. Remove the three batteries.
3. Insert new batteries in the direction as depicted inside the compartment. The meter uses 357A batteries.
4. Close the battery compartment. Make sure it is tightly closed to retain waterproofness.

*NOTE: Do not reverse the polarity of the batteries. This may **short circuit** the meter.*

Cleaning and sensor care:

1. Never touch the sensor!
2. To clean the unit, use a soft tissue or towel. Wipe with water and a mild soap or rubbing alcohol.
3. To clean the sensor, rinse in distilled water or a 7 pH buffer solution. If cleaning with a 7 pH buffer solution, lightly dab (touch) the sensor on a soft tissue. Never rub the sensor with a tissue or anything else, as this may scratch the glass.
4. If the glass is scratched or marred, the sensor needs to be replaced.
5. If the sensor is dried up (or the gel within it), you can attempt to re-moisten the sensor by keeping it in a 7.0 pH solution for at least two hours. If the meter still does not function properly or accuracy is not at optimum performance, the sensor may be irreparably damaged and must be replaced.
6. For best results, clean the sensor after each use, especially if used in very low or very high pH liquids, or liquids other than water.
7. PROBE STORAGE: Storing the probe in a 4 pH KCl buffer solution is preferred (the meter is shipped with this solution in the cap, as well as an extra bottle). It is okay to rinse the probe in distilled water, but never store the probe in distilled water. Storing the probe in a higher pH buffer solution will not damage it.
8. When not in use, store the meter standing upright. This will ensure proper saturation of the sensor.

Sensor Replacement:

If your sensor has been damaged, you can purchase a new one without having to purchase a new meter. To replace the sensor:

1. Remove the sensor gasket ring by twisting it counter-clockwise.
2. Gently pull the sensor off the unit.
3. Gently insert the new sensor into the unit. Be sure to align the grooves properly. Never force the sensor into the unit!
4. Make sure the rubber ring is properly positioned on the sensor.
5. Screw the gasket ring back onto the unit by twisting it clockwise. Tighten to ensure waterproofness.

Sponge Care:

1. Never add distilled or tap water to the sponge/cotton ball in the cap, as mildew or mold may form.
2. Rewet with HM Digital's storage solution or a professionally made pH 4.0 KCl solution with bactericide.

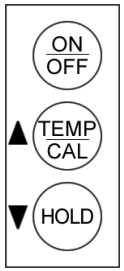
TAKING MEASUREMENTS

The ORP-200 can take measurements of ORP levels (mV) and temperature.

ORP Measurements

IMPORTANT: For best measurements, use a glass or ceramic vessel (not paper, plastic or metal).

1. Remove the cap.
2. Press the 'ON/OFF' button. The display will become active.
3. Dip the meter into the water sample, liquid or solution to be tested.
4. Lightly swirl the meter to ensure the removal of trapped air bubbles or electric charges. **Do not tap it against the glass.**
5. The meter will display a reading almost immediately. Keep the meter in the liquid until the reading stabilizes (approx. 30 seconds) for an accurate reading. *NOTE* ***– It is a normal function of ORP for the reading to fluctuate slightly and not fully stabilize in certain situations (up to 1-3 minutes).***
6. To view the reading out of the liquid, quickly press the 'HOLD/MODE' button while the meter is in the liquid. This will hold the reading on the screen. Quickly pressing the 'HOLD/MODE' button again will release it.
7. Press the 'ON/OFF' button to turn the meter off.
8. Shake any excess water off the meter and rinse with distilled or de-ionized water. Put the cap back on.



NOTE – The ORP-200 is extremely sensitive in low conductivity water (below 50 μS). It is not recommended to use this meter in water below 10 μS. If you do use the meter in such water, it is better to test in flowing water, or swirling the meter continuously while obtaining the reading. The reading should stabilize in 10-15 seconds.

Temperature Measurements

The temperature reading is always displayed on the LCD panel during measurement mode, and is shown simultaneously for ORP readings. It is not shown when the meter is in calibration mode. The default temperature reading for the meter is in Celsius.

1. Remove the cap.
2. Press the 'ON/OFF' button. The display will become active.
3. The temperature reading is always displayed on the LCD panel (except in calibration mode), and is shown simultaneously for ORP readings.
4. The default mode for temperature is Celsius. To change the temp mode, quickly press the 'TEMP/CAL' button to switch from Celsius to Fahrenheit or vice-versa.
5. Dip the meter into the water sample or solution to be measured.
6. The temperature reading will change immediately (unless the solution is at room temp). For very hot or cold liquids, the reading may take slightly longer to stabilize.
7. Press the 'ON/OFF' button to turn the meter off.
8. Shake any excess water off the meter and rinse with distilled or de-ionized water. Put the cap back on.

NOTE – Because of the sensitivity of the ORP sensor and reference tube, it is not recommended to use your meter as a thermometer in very hot or very cold liquids.

Switching Temperature Modes:

The default temperature reading for the meter is in Celsius. To change the temperature mode, quickly press the 'TEMP/CAL' button to switch from Celsius to Fahrenheit or from Fahrenheit to Celsius.

CALIBRATION

Your ORP-200 meter has been factory-calibrated to a 200 mV buffer solution. While this is suitable for most applications and initial usage, for improved accuracy, ORP meters should be calibrated frequently (once a month or more, depending upon usage). Additionally, it should be noted that ORP buffer solutions may vary amongst manufacturers. For best results, the ORP-200 should be recalibrated to an ORP buffer solution that suits your specific needs.

The ORP-200 features auto-ranging calibration with digital fine tuning. The meter can be calibrated to a maximum of 100 mV offset from the auto-range (up to 100 mV above or below what the meter reads in calibration mode).

1. Turn the meter on by pressing the 'ON/OFF' button. Note that the reading will fluctuate when the meter is not submersed in a liquid. It will begin to stabilize once it is in a liquid.
2. Dip the meter into a ORP buffer solution with a value of 80 mV to 600 mV (or a liquid that is known or certified to have a mV level in this range). Lightly stir the meter for approximately 30 seconds. The reading will change during this time and may continue to change slightly after 30 seconds. This is normal. Let the meter sit for approximately 1-3 minutes to ensure stabilization.
3. Press and hold the 'TEMP/CAL' button. The temperature display will change to a 'CAL' image.
4. The meter will automatically adjust to a reading within a range of the solution the meter is in.
5. Change the reading so that it matches the buffer solution. For example, if your calibration solution is 200 mV, decrease or increase the reading until it reads '200'. To increase the reading, press the 'UP' button (TEMP/CAL). To decrease the reading, press the 'DOWN' button (HOLD).
   - *If the calibration reading reaches the minimum or maximum level within the range (+/- 100 mV), the screen will display the 'minimum calibration reached' icon or 'maximum calibration reached' icon, respectively. Note that this occurs only within the range of the sample the meter is currently in. When 'CAL' does not flash, it means calibration is in the middle of the range.*

6. To set the calibration, press and hold the 'TEMP/CAL' button until the screen reverts back to the measurement mode.
7. Your meter is now re-calibrated.

NOTE – Negative ORP calibration buffers (below 0 mV) do not exist. This is because the moment a solution with a negative ORP is exposed to the oxygen in air, the ORP level will begin to rise. Therefore, if you are routinely testing for negative ORP levels, it is recommended to calibrate to a very low positive ORP, such as HM Digital's +92mV buffer.

NOTE – The sensor is very sensitive. It is normal for the reading to fluctuate by 1 or 2.

CARE, MAINTENANCE & TECHNIQUES

As with all ORP and pH meters, the ORP-200 requires proper maintenance to ensure a healthy lifespan for the meter. With proper care, the sensor will be good for approximately 12 months. Sensor lifespans vary, and replacement ORP-200 sensors can be purchased from your HM Digital distributor.

General techniques:

1. Do not store the unit in high temperature or direct sunlight.
2. Store the meter upright (standing on the cap, so that you can read the text).
3. Never touch the sensor! Skin oils may adversely affect the reading. If you do touch the sensor, clean immediately with distilled water or a pH 7 buffer solution (see cleaning instructions).
4. Always immediately replace the cap when the meter is not in use. The ORP-200 cap contains a small wetted sponge or cotton ball to ensure that the gel within the glass sensor does not dry up. *NOTE – A tightened cap will ensure a longer lifespan for your sensor!*
5. It is normal for salt deposits to form on the outside of the cap or rim of the cap. This is from the storage solution from within the cap, having dried up. If salt deposits appear, simply wipe off with a soft tissue and rubbing alcohol.
6. Using the ORP-200 in high temperature liquid, such as hot coffee, will shorten the lifespan of the sensor. If testing in hot liquid is essential, be sure to not keep the meter in the hot liquid very long. (Room temperature coffee will not adversely affect the sensor.)
7. After repeated usage in high TDS liquids, it is advised to clean the sensor to prevent residue build-up.
8. If testing liquids other than water, always be sure to rinse the sensor with distilled water or a ph 7 buffer solution afterwards. Never store the sensor in distilled water.
9. If testing two samples over a wide range (e.g., -400 mV and 700 mV), make sure to rinse the sensor in distilled water or a pH 7 buffer solution between and after tests. Avoid keeping the sensor in very high or low ORP liquid for extended periods. High or low ORP values may take longer to register.
10. For optimum performance, it is best to use the meter at least once per month.

For best measurement accuracy:

1. Though it is not necessary, the ORP-200 will be more accurate if calibrated before each use. This is the case with all digital ORP and pH meters.
2. Clean with distilled water or a pH 7 buffer solution after each use, even if checking the same sample.
3. If an air bubble is lodged in the sensor, dip the meter in distilled water and stir. Remove the meter from the water and shake excess water off.
4. If the sensor is scratched or marred, it must be replaced.
5. If the readings seem to slow down and continue to get slower, or the meter seems to have become unresponsive or sluggish, you may need to change the batteries or replace the sensor. Lifespans of sensors are limited. Lifespans vary depending upon usage. It is normal for a sensor to wear out.

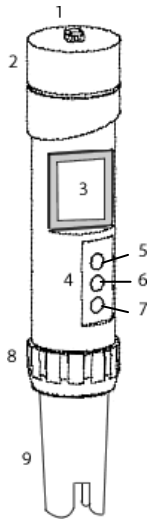
***FOR ADVANCED USERS ONLY*:** If the meter is continuously used to check widely varying mV levels and is also continuously recalibrated at different levels, performance may be affected. If you find your meter is not be working at optimum performance, press and hold the 'TEMP/CAL' button. Once 'CAL' is flashing on the screen, press and hold both the 'TEMP/CAL' and 'HOLD' buttons at the same time for two seconds. This will reset the calibration. It is then necessary to recalibrate the meter (see the Calibration chapter for more information).

NOTE – If you are experiencing incorrect readings, the meter will need to be re-calibrated. Low batteries may also negatively affect the measurement accuracy.

HOUSING AND SCREEN DESCRIPTION

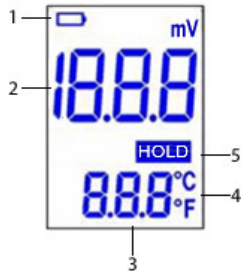
Housing

1. Lanyard hook
2. Battery compartment
3. LCD display
4. Button panel
5. Power button
6. Calibration mode, temperature mode, calibration-up button
7. Hold, calibration-down button
8. Sensor gasket ring
9. Detachable sensor (electrode)



LCD Display

1. Low battery indicator
2. ORP measurement (mV)
3. Temperature measurement
4. Celsius/Fahrenheit mode
5. Hold mode



BEFORE YOU START!

1. The meter is shipped with the cap on tight to ensure proper condition of the electrode, which must remain wet. You will notice that there is liquid in the cap (a 4 pH KCl buffer solution). Be careful not to spill it. To remove the cap, hold the meter and twist off.
2. If the storage solution has spilled or dried up, replace with the solution included in the little bottle. Fill to the second dot on the cap.
3. For new meters, allow a longer response time for measurement readings. The response time of your meter will quicken with usage. For your first few tests, lightly swirl the meter in the water/solution 3 times and allow the meter to sit while adjusting to the reading.
4. If you need to test the ORP of low conductivity water (below 50 μS), you should do so only after using the meter a few times in an ORP buffer solution or higher conductivity water.
5. Never touch the electrode or reference tube. Be sure not to touch the glass electrode or reference tube to the side of a glass or beaker.
6. Always make sure that the cap is on tight after usage.